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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,693	12/02/2003	Toshihiro Hayami	246076US2SP	1975
22850 7590 01/03/2008 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER KACKAR, RAM N	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 01/03/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/724,693

Applicant(s)

HAYAMI ET AL.

Examiner

Ram N. Kackar

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1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3-5, 8-13 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-5, 8-13 and 18-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/29/2007 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 3-5, 8-13 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants admitted prior art (AAPA) in view of Tamagawa et al (JP 03072624) and Craig A. Phelps (US 5724234) and further in view of Hannigan et al (US 5999081) as evidenced by (Article in Publication, Sensors handbook by Sabrie Soloman - Copy right 1999) and Shimamura et al (US 5707500).**

AAPA discloses a method of temperature measurement of a susceptor disposed in a conductive vessel of anodized aluminum set to ground potential and having a space formed

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therein in which a plasma is generated by application of a radio frequency power which in recent years have gone in frequency to 40 MHz, 60 MHz or 100 Mhz.

AAPA do not disclose the measurement of temperature of the susceptor by a radiation thermometer using infrared rays. However measuring temperature by an infrared thermometer is common.

Tamagawa et al disclose temperature measurement of a sample in a plasma etching chamber (Fig 1) by an infrared thermometer (262) looking through a partially drilled hole (25) in the electrostatic chuck to sense the temperature of the chuck and another sensor (162) through a through hole (15). Further, the infrared thermometer is installed so as to close the opening of the hole (18 or 28).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use infrared thermometer for its accurate and reliable measurement of temperature.

AAPA as modified by Tamagawa et al do not disclose any limitation on the size of the opening. However it is inherent that an opening made in the AAPA to allow an infrared radiation to pass also allows the possibility of RF leak.

Craig A. Phelps teaches that RF power leaks through openings of a size greater than the wavelength of the radio frequency and the leakage decreases linearly as the size of the opening decreases (Col 1 lines 60- Col 2 line 8). Craig A. Phelps further teaches that the opening should be less than 1/20 of the wavelength.

It would be obvious therefore that at higher frequency the leak of an opening would increase and therefore at higher frequency smaller and smaller opening (less than 1/50 of the wavelength) will be preferable to prevent RF leak.

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Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use opening of as small a size as feasible in order to prevent RF leak through the opening.

Applicants admitted prior art (AAPA) in view of Tamagawa et al and Craig A. Phelps as discussed above do not disclose that the measuring portion of the susceptor is structured as a blackbody, which is anodized.

Advantage of a black body for infrared temperature measurement are well known as evidenced by (Article in Publication, Sensors handbook by Sabrie Soloman -Copy right 1999) and Shimamura et al. It is known through basic understanding of radiation thermometry that the infrared radiation energy emitted from heated surface is proportional to the emissivity of the surface and to  $T^4$  where T is the temperature. Since emissivity of a black body is 1 it is obvious that signal for temperature measurement will have a better signal/noise ratio for a black body (See Article 84 specially 84.4). Same teaching is echoed by Shimamura et al (Col 19 lines 34 to Col 20 line 65) who teach the use of making the inside of shielding cylinder as blackbody to reduce stray light (black body absorbs and does not reflect light).

Hannigan et al teach that blackbody surface could be achieved by anodized aluminum (Col 5 lines 1-9).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use anodized surface as blackbody especially since the process vessel was constituted of anodized aluminum.

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**4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over (AAPA) in view of Tamagawa et al (JP 03072624), Craig A. Phelps (US 5724234) and Hannigan et al (US 5999081) as applied to claims 3-5, 8-13 and 16-19 and further in view of Bowers III et al (US 5680025).**

Applicants admitted prior art (AAPA) in view of Tamagawa et al and Craig A. Phelps as discussed above disclose all the limitations of this claim except do not disclose that the measuring portion of the susceptor is structured as a blackbody, which is a black tape.

Bowers III et al teach that to measure the temperature of a surface by IR probe the surface should have a known emissivity and since a black surface provided by a black tape will have an emissivity of 1 temperature could be measured accurately (Col 8 lines 39-52).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use black tape in the measurement hole for accurate measurement.

### ***Response to Arguments***

Applicant's arguments filed 10/29/2007 have been fully considered but they are not persuasive.

Applicant argues that Craig A. Phelps does not does not describe or suggest that the opening has a diameter of  $1/50$  or less of a wavelength.

In response it is noted that according to Craig A. Phelps, as noted below, the opening should be as small as possible since the leakage will decrease linearly with decrease of gap.

"It is known, for example, that there will be little or no shielding of RF energy at a particular frequency if the size of any gap between the shield can and the PCB is equal to or

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greater than the wavelength of that frequency and, further, that the amount of RF energy which will leak through any gap that is smaller in size than the wavelength will decrease linearly with the decrease in the size of the gap. It is also generally believed that, to avoid significant leakage of RF energy at any frequency of interest, the gap size should be no more than 1/20 of the wavelength of that frequency”.

Further, regarding the argument of the applicant that the opening of the vessel is not closed, it is noted that the opening in Tamagawa et al is disclosed to be closed.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Ram', followed by a horizontal line.

Ram Kackar

Primary Examiner AU 1792